

Twenty-four hours later, or on the morning of the 9th, a redevelopment of the storm had occurred over the Middle Mississippi Valley, and it was thus necessary to continue the warnings on Lakes Superior and Ontario, and on the northern portions of Lakes Michigan and Huron. At the same time small-craft warnings were displayed on Lake Erie. The warnings were lowered at 1 p. m. on Lake Ontario and at 9 p. m. elsewhere, as the storm lost energy rapidly after the morning of the 9th.

On the night of the 11th an advisory message was sent to all Lower Lakes stations relative to a disturbance then centered in southeastern Virginia and moving due north. By the following morning the center was near the District of Columbia, and the wind had reached moderate gale force at Cleveland, Ohio. Therefore, northeast warnings were issued for the Lower Lakes, except that the direction was made northwest west of Cleveland. The warnings were lowered at 9:30 p. m., the regular p. m. reports having showed that the storm was losing its force.

A northwest storm warning for Duluth, Minn., only, was issued at 2 p. m. of the 11th, the special observations indicating a disturbance over eastern Minnesota and a sharp gradient to the westward, with strong winds over North Dakota. It was necessary to continue this warning 24 hours later, owing to the fact that the disturbance had remained almost stationary during the 24 hours in question; at the same time the warnings were extended along the east shore of Lake Michigan. All warnings were lowered at 9:30 p. m., however, when it had become evident that the disturbance was losing energy.

On the morning of the 17th a rather deep low pressure area appeared north of Lake Superior, the lowest barometer being 29.32 inches. Thence southward to the Ohio River the gradient was marked. Accordingly, small-craft warnings were issued for Lakes Huron, Erie, and Ontario, but as developments showed, it would have been better to have displayed storm warnings. At points on Lakes Erie and Ontario verifying velocities were slightly exceeded. The disturbance was sluggish in its eastward progress, and small-craft warnings were again ordered on the morning of the 18th for the Lower Lakes, also for Lakes Superior and Huron. On this date moderate gales, and in some cases verifying velocities, occurred over portions of the Lakes in question.

The storm of the 23d-24th followed as a result of a general fall in pressure over the West during the two preceding days. On the morning of the 23d the disturbance existed as a trough extending from Lake Superior southwestward to Arizona, with the lowest pressure in southwestern Nebraska. At that time northwest warnings were issued for Lake Superior, and southwest warnings for Lakes Michigan, Huron, and Erie. In the afternoon the southwest warnings were extended over Lake Ontario. The disturbance moved northeastward with about normal velocity, but with an increase in energy. For the most part, the warnings issued in this connection were verified. On the night of the 23d the direction was changed to northwest on Lake Michigan, and likewise on Lakes Huron, Erie, and Ontario the following morning. Also, the northwest warnings were continued on Lake Superior east of Munising on the morning of the 24th. At 1 p. m. the warnings were lowered on Lake Michigan, southern Lake Huron, and Lake Erie west of Dunkirk, and at 9 p. m. on Lake Ontario, northern Lake Huron, and Lake Erie, from Dunkirk, N. Y., east. A redevelopment of this storm occurred on the night of the 24th-25th in the vicinity of Lake Superior, with the result that it was necessary to issue northwest warnings on the morning of the 25th for that Lake from Munising west, and also for

northern Lake Huron, as well as to continue the warnings on Lake Superior east of Munising. At the same time small craft warnings were issued for northeastern Lake Michigan, southern Lake Huron, and the Lower Lakes. At 9:30 p. m. the storm warnings were lowered. At Duluth, Minn., the wind reached a maximum velocity of 42 miles an hour on the 25th, and Alpena reported a maximum of 36 miles an hour on the following day.

Near the close of the month a disturbance from the Southwest threatened the southern Lake Region, especially the Lower Lakes, but it passed without causing winds of storm force. The only warning issued in this connection was that for small craft at Chicago.

The long range forecasts for the benefit of fruit interests in Door County, Wisconsin, were resumed during the month, and a similar service was begun for southwestern Michigan. Also, fire-weather forecasts were made for western Montana, the information being furnished to six Forest Supervisors.—*C. A. Donnel.*

#### NEW ORLEANS FORECAST DISTRICT

Small-craft warnings were displayed on the Texas Coast on the 6, 9, 10, 11, 15, 24, 26, and 28, and on the Louisiana Coast on the 29 and 30, for local thunder squalls. No general storm occurred on the Coast. Warnings for local thunderstorms were issued for Arkansas, Oklahoma, and eastern Texas on the 6; for Louisiana, Arkansas, and eastern Texas on the 27; Louisiana and East Texas on the 28; and Louisiana, eastern Texas and eastern Arkansas on the 29. Local thunderstorms occurred in the several States as forecast, and in a few localities the storms were severe.

Frost warnings were issued for the Texas Panhandle on the 7th, and for northern Oklahoma on the 15th.—*I. M. Cline.*

#### DENVER FORECAST DISTRICT

Low pressures prevailed on the Rocky Mountain Plateau during most of the period from the 1st to the 27th, with generally high pressures on the eastern slope and in the Plains States from the 6th to the 24th. There was little precipitation during the first two decades, and such occasional light showers as did occur were confined mostly to Colorado and extreme eastern New Mexico.

A low of considerable intensity that advanced from British Columbia to western Texas on the 24th, 25th, and 26th, together with a depression that remained over the extreme Southwest until the end of the month and a high that prevailed in the Northern Rocky Mountain States and the upper Missouri Valley after the 26th, was attended by showers in Colorado and Utah and occasionally in northern New Mexico from the 25th to the 30th, with snow in the mountains of Colorado. Heavy showers fell in Colorado and eastern and northern Utah from the 27th to the 29th and in northern New Mexico on the 30th. The temperature was much below normal in Colorado and Utah from the 26th to the 31st.

Frost warnings were issued as follows: 1st, frost in Colorado, extreme northern New Mexico, and the higher elevations of southern Utah; 5th, frost in the western valleys of Colorado, northern New Mexico, heavy frost in Utah, and freezing temperature at the higher elevations of southern Utah; 6th, heavy frost in Colorado and Utah, frost in northern New Mexico, freezing temperature at the higher elevations of Utah; 7th, frost in Colorado, northern New Mexico, and Utah; 8th, frost or freezing temperature in southwestern Colorado and frost in extreme northern New Mexico; 9th, frost or freezing